CHAPTER 1

The Revit World

Before we get started, I think we should set the record straight. I'm sure you have seen plenty of presentations on how wonderful and versatile this 3D Revit revolution thing is. And I'm sure you may be thinking, "This all seems way too complicated for what I do. Why do I need 3D anyway?"

The answer to that question is: you don't. What do you do to get a job out — that is, after the presentation has run its course and you are awarded the project? Your first step is to redraw the plans. Next comes the detail round-up game we have all come to love: we pull the specs together, and then we plot. This is quite a simple process, and guess what? It works.

Well, it has worked up until this 3D thing showed up. Now the process seems to be this convoluted approach in which we have no real clue where things come from, drawings don't look very good, and getting a drawing out the door takes three times as long.

- **The Revit Architecture interface**
- **The Project Browser**
- **File types and families**

COPYRIGHTED MATERIAL

The Revit Architecture Interface

Toto, we are not in CAD anymore!

If you just bought this book, then welcome to the Revit world. In Revit, you will find that the vast majority of the processes you encounter are in a flat 2D platform. Instead of drafting, you are placing components into the model. Yes, these components have a so-called third dimension to them, but a logical methodology drives the process. If you need to see the model in 3D, it is simply a click away. That being said, remember this: there is a big difference between 3D drafting and modeling.

NOTE The preceding paragraph will be the longest one of the book. This book is designed to cut to the chase and show you how to use Revit Architecture in a step-by-step fashion without having to read through paragraph after paragraph just to find the answer you are looking for. Datasets are provided at the book's accompanying website (`www.sybex.com/go/revit2011ner`), but you can also use your own model as you go through the book. If you do not wish to read this book cover to cover, don't! Although I recommend going from front to back, you can use the book as a desk reference by jumping to a desired topic. The datasets will be added in phases to accommodate this type of usage. Either way, get ready to learn Revit Architecture!

With that preamble behind us, let's get on with it.

First of all, Revit has no command prompt and no crosshairs. Stop! Don't go away just yet. You will get used to it, I promise. Unlike most CAD applications, Revit Architecture is heavily pared down, so to speak. It's this way for a reason. Revit was designed for architects and architectural designers. You do not need every command that a mechanical engineer would need. An electrical engineer would not need the functionality that an architect would require.

What you will find as you start getting comfortable with Revit is that there are many, many choices and options behind each command.

Let's start at the beginning:

1. To open Revit Architecture, click the icon on your desktop (see Figure 1.1), or choose Start ➢ All Programs ➢ Autodesk ➢ Autodesk Revit Architecture 2011 ➢ Autodesk Revit Architecture 2011 (see Figure 1.2).

2. After you start Revit, you see the Recent Files window shown in Figure 1.3. The top row lists any projects you have been working on; the bottom row lists any families you have been working on.

FIGURE 1.1 You can launch Revit Architecture from the desktop icon.

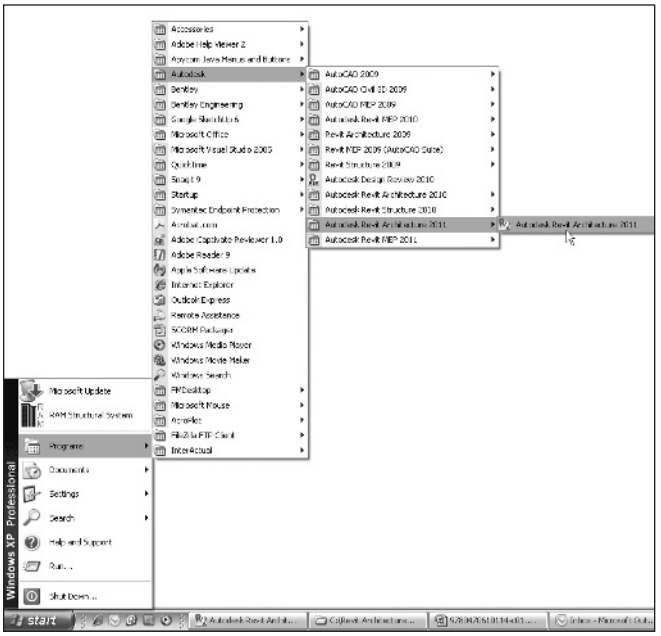


FIGURE 1.2 You can also launch Revit Architecture using the Windows Start menu (this shows the Windows Vista operating system).

3. If you are firing up Revit for the first time, both of these rows will be blank. At the bottom of each row, you can choose to create a new model or open an existing one (see Figure 1.4).

4. In the upper-left corner of the Revit window, you will see a big purple R. Click the purple R and choose New ➢ Project.

5. The New Project dialog shown in Figure 1.5 opens. You can use the default template or no template, or you can create a new template by clicking the Project Template radio button. (We will cover template creation later in the book.) For now, just click OK to create a new project using the default template. You do not need to alter anything in this dialog.

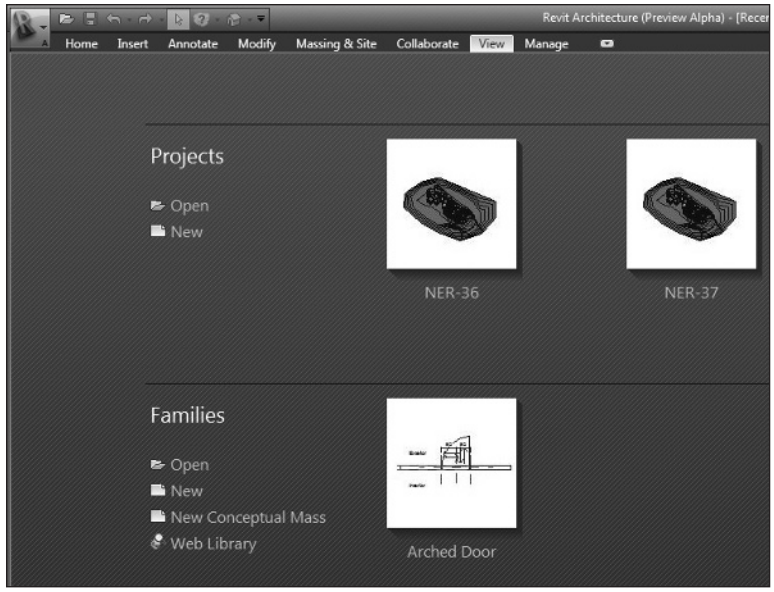


FIGURE 1.3 The Recent Files window lists any recent projects or families you have worked on.

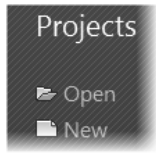


FIGURE 1.4 You can create a new model or browse for an existing one.

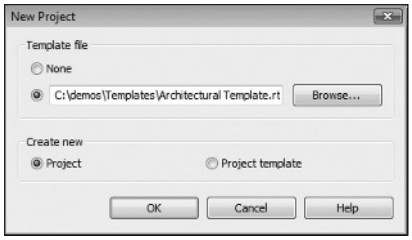


FIGURE 1.5 The New Project dialog allows you to start a new project using a preexisting template file, or you can create a new template file.

Now that the task of physically opening the application is out of the way, we can delve into Revit. At first, you will notice many differences between Revit and CAD. Some of these differences may be off-putting, while others will make you say "I wish AutoCAD did that." Either way, you will have to adjust to a new workflow.

The Revit Workflow

Revit has a certain feel that you AutoCAD converts will need to get a grasp on. This new workflow may be easy for some to adapt to, whereas others will find it excruciatingly foreign. (To be honest, I found the latter to be the case at first.) Either way, it is a simple concept. You just need to slow down a bit from your AutoCAD habits.

Executing a command in Revit is a three-step process:

1. At the top of the Revit window is the Ribbon, and built into the Ribbon is a series of tabs. Each tab contains a panel. This Ribbon will be your Revit launch pad! Speaking of launch pad, click the Wall button on the Home tab, as shown in Figure 1.6.

2. After you click the Wall button, notice that Revit adds an additional tab to the Ribbon, with options specific to the command you are running, as shown in Figure 1.7. This tab allows you to make different choices based on the placement of a wall. You may also notice that Revit places an additional Options bar below the Ribbon for more choices.

FIGURE 1.6 The Ribbon is the backbone of Revit Architecture.

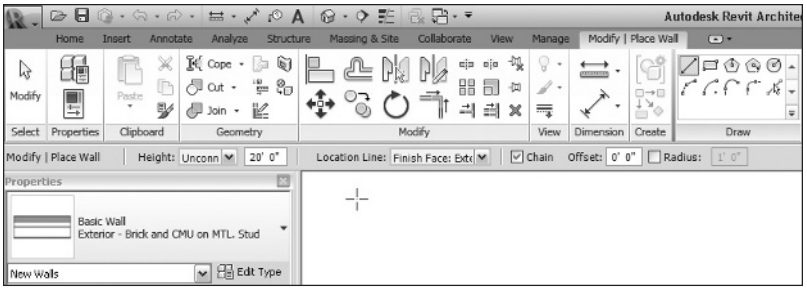


FIGURE 1.7 The Options bar replaces the command prompt from AutoCAD. Microstation users will be more familiar with this method.

You will hear this throughout the book: always remember to look at your options. With no command prompt, the Options bar will be one of your few guides.

3. After you make your choices from the Ribbon and the Options bar, you can place the object into the view window. This is the large drawing area that takes up two thirds of the Revit interface. To place the wall, simply pick a point in the window and move your pointer. The wall starts to form. You can press the Esc key to exit the command.

Using Revit is not generally as easy as this, but keep in mind this basic three-step process:

1. Start a command.
2. Choose an option from the temporary tab that appears.
3. Place the item in the view window.

Revit appears to offer a fraction of the choices and functionality that AutoCAD or any drafting program offers. This is true in a way. Revit does offer fewer choices to start a command, but how many choices does an architect or architectural designer need? Revit keeps its functionality focused on architecture and construction. Revit gets its robust performance from the dynamic capabilities of the application during the placement of the items and the functionality of the objects after you place them in the model. Never judge a book by its cover — unless, of course, it is the book you are reading right now.

Let's keep going with the main focus of the Revit interface: the Ribbon. You will be using the Ribbon exclusively within Revit.

Using the Ribbon

You will use the Ribbon for the majority of the commands you execute in Revit. As you can see, you don't have much choice to do otherwise. However, this is good because it narrows your attention to what is right in front of you. When you click

an icon on the Ribbon, Revit will react to that icon with a new tab, giving you the specific additional commands and options you need. Revit also keeps the existing tabs that can help you in the current command, as shown in Figure 1.8. Again, the focus here is to keep your eyes in one place.

In this book, I will throw a few new terms at you, but you will get familiar with them quickly. We just discussed the Ribbon, but mostly you will be directed to choose a tab, and to find a panel on that tab.

To keep the example familiar, when you selected the Wall button, your instructions will read: "On the Build panel of the Home tab, click the Wall button."

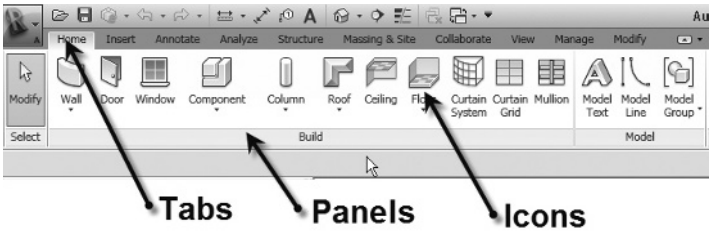
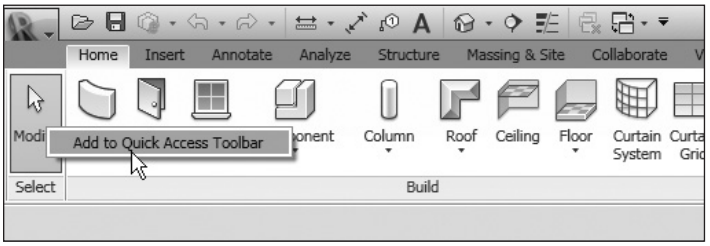


FIGURE 1.8 The Ribbon breakdown

What's That Toolbar above the Ribbon?

This toolbar is called the Quick Access toolbar. It is filled with some popular commands. One special function of this toolbar is the cursor icon. You use this icon when you wish to terminate a command. If you want to add to this toolbar, simply right-click any icon and select Add To Quick Access Toolbar. To the left of this toolbar is the Revit Home button. Clicking this button gives you access to more Revit functions that will be covered later in the book.



Now that you can see how the ribbons and the tabs flow together, let's take a look at another feature within the Ribbon panels that allows you to reach beyond the immediate Revit interface.

The Properties Interface

When you click the Wall button, an entirely new set of commands appears. This new set of commands combines your basic Modify commands with an additional tab specific to your immediate process. In this case that process is adding a wall. You will also notice that a Properties dialog appears to the left of the screen. If you do not see the Properties dialog, click the Properties icon that is displayed in Figure 1.9. In the Properties dialog is a picture of the wall you are about to place. If you click on this picture, Revit will display all the walls that are available within the model. This display is called the Change Element Type menu (see Figure 1.10).

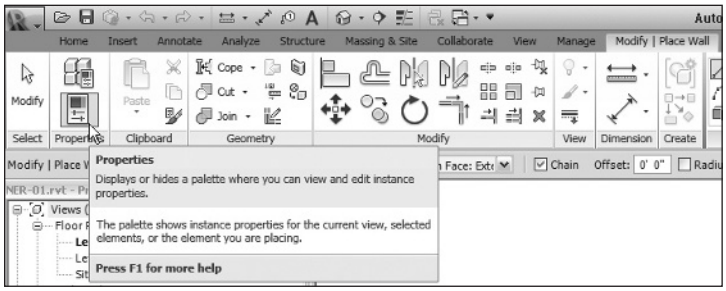


FIGURE 1.9 Click the Properties button to display the Properties dialog. Typically the dialog is shown by default.

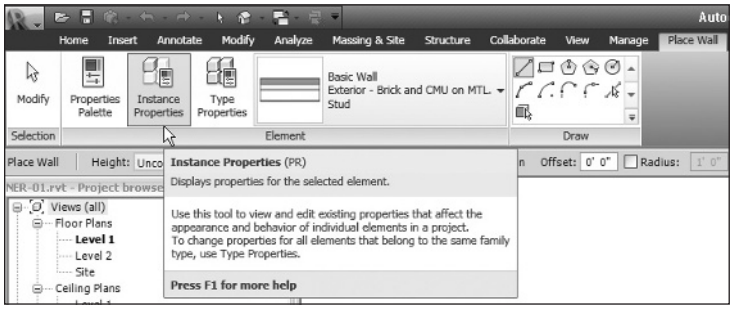


FIGURE 1.10 The Properties button gives you access to many variables associated with the item you are adding to the model.

The objective of the next exercise is to start placing walls into the model:

1. Open Revit Architecture using the default template.

2. On the Home tab, click the Wall button.
3. In the Properties dialog, select Exterior - Brick and CMU on MTL.Stud.

Element Properties

Hidden within the Options bar is a single button. There are two different sets of properties you will deal with in Revit: Instance Properties and Type Properties. Instance Properties will be available immediately in the Properties dialog when you place, or select, an item. If you make a change to an element property, the only items that are affected in the model are the items you have selected.

The Properties Dialog

The Properties dialog is new to Revit Architecture 2011. As just mentioned, the Properties dialog will display the Instance Properties of the item you have selected. If no item is selected, this dialog will display the View Properties.

In addition to accessing the Instance Properties, you can click the Edit Type button to open a dialog displaying the Type Properties of the selected item (see Figure 1.11). By making a modification here, you will change every occurrence of that item in the entire model.

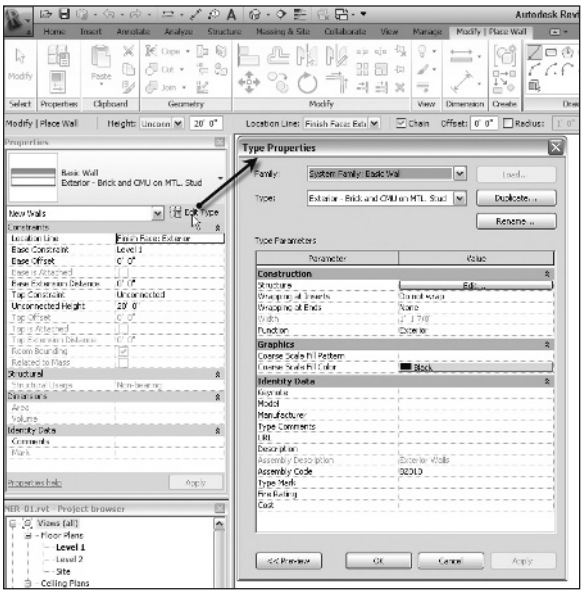


FIGURE 1.11 The Type Properties dialog gives you access to the parameters associated with the element you have selected.

Let's take a closer look at the two categories of Element Properties in Revit.

Instance Properties

The items that you can edit immediately are called parameters, or Instance Properties. These parameters will change only the object being added to the model at this time. Also, if you select an item that has already been placed in the model, the parameters you see immediately in the Instance Properties dialog will change only that item you have selected. This makes sense — not all items are built equally in the real world. Figure 1.12 illustrates the Instance Properties of a typical wall.

Type Properties

The Type Properties (see Figure 1.13), when edited, will alter every item of that type in the entire model. To access the Type Properties, click the Edit Type button in the Properties dialog, as Figure 1.14 shows.

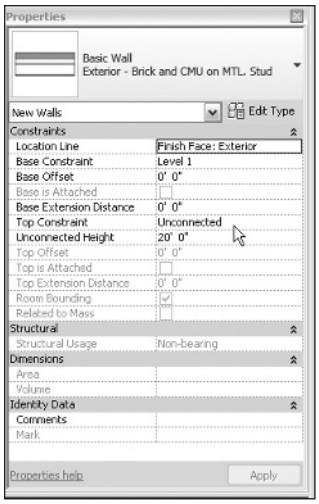


FIGURE 1.12 The Instance Properties will change only the currently placed item or the currently selected item.

At this point, you have two choices. You can either make a new wall type (leaving this specific wall unmodified) by clicking the Duplicate button, or you can start editing the wall's Type Properties, as shown in Figure 1.15.

WARNING I cannot stress enough that if you start modifying Type Properties without duplicating the type, you need to do so in a very deliberate manner. You can easily affect the model in unintended ways. We will discuss the specifics of all the wall's Type Properties in Chapter 16, "Advanced Wall Topics."

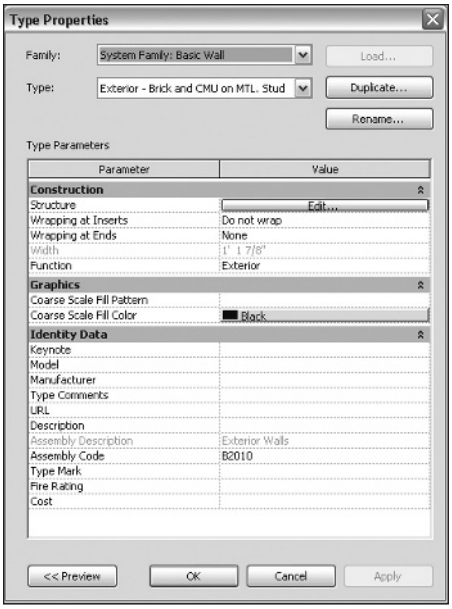


FIGURE 1.13 The Type Properties, when modified, will alter every occurrence of this specific wall in the entire model.

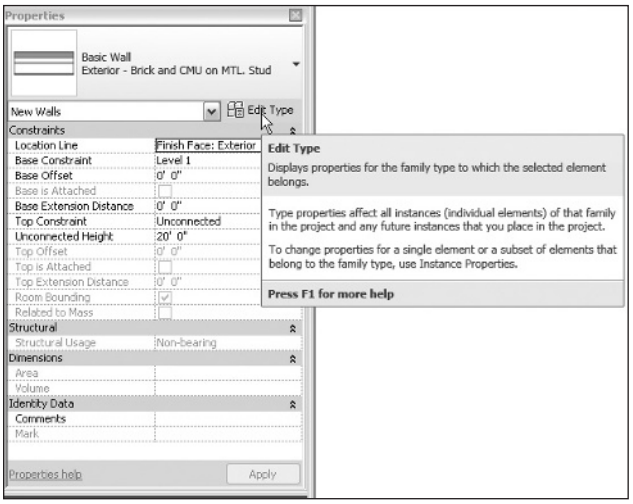


FIGURE 1.14 The Edit Type button allows you to access the Type Properties.

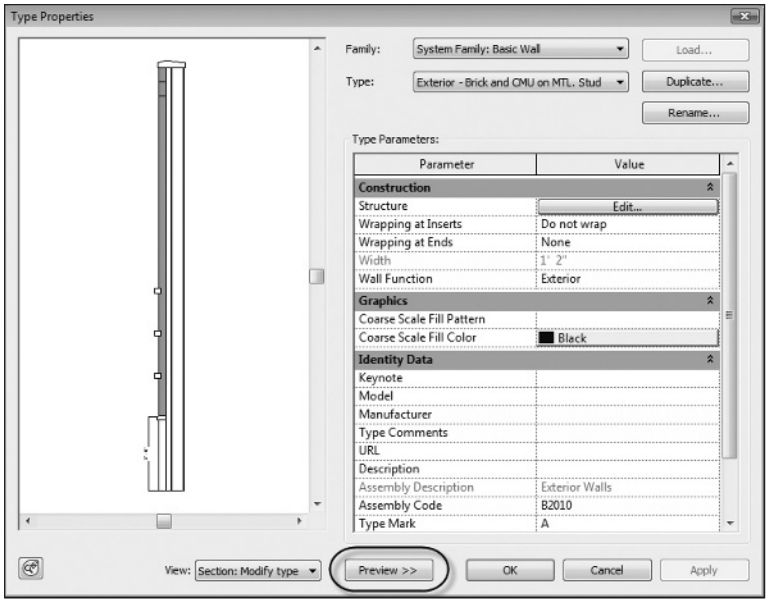


FIGURE 1.15 **The Type Properties are used to modify the wall system's global settings. Click the Preview button at the bottom of the dialog to see the image that is displayed.**

Now that you have gained experience with the Type Properties dialog, it is time to go back and study the Options bar as it pertains to placing a wall:

1. Since we are only exploring the Element Properties, click the Cancel button to return to the model.
2. Back in the Options bar, find the Location Line menu. Through this menu you can set the wall justification. Select Finish Face: Exterior (see Figure 1.16).
3. On the Options bar, be sure the Chain checkbox is selected, as Figure 1.16 shows. This will allow you to draw the walls continuously.
4. In the Draw panel, there is a series of sketch options. Because this specific wall is straight, make sure the Line button is selected, as shown in Figure 1.17.

Get used to studying the Ribbon and the Options bars — they will be your crutch as you start using Revit Architecture! Of course, at some point you need to physically start placing items in the model. This is where the view window comes into play.

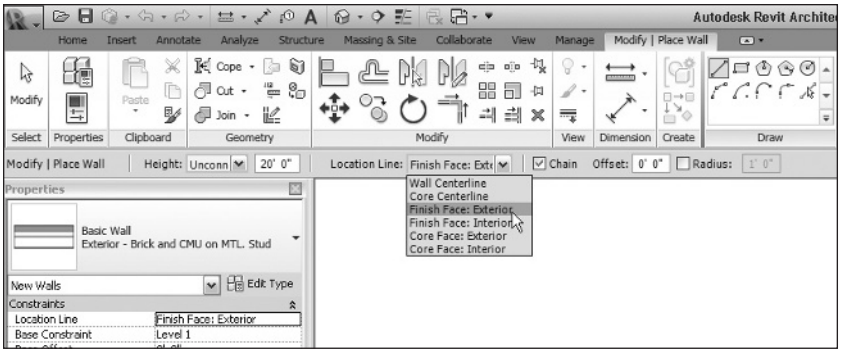


FIGURE 1.16 By selecting Finish Face: Exterior, you know the wall will be dimensioned from the outside finish.

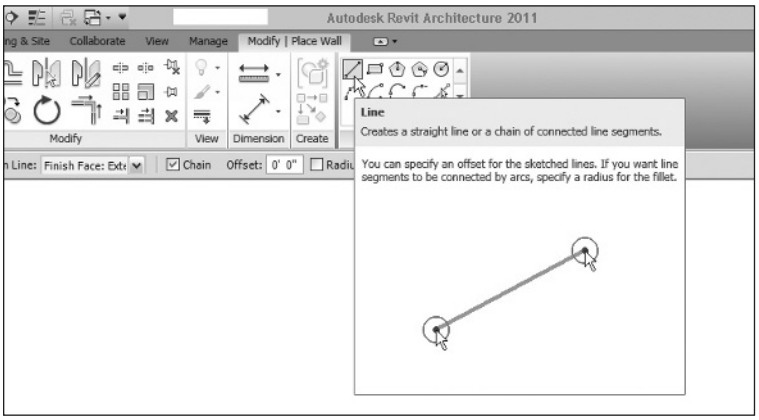


FIGURE 1.17 You can draw any shape you need.

The View Window

To put it simply, "the big white area where the objects go" is the view window. As a result of your actions, this area will become populated with your model. Notice the background is white — this is because the sheets you plot on are white. In Revit, what you see is what you get … literally. In Revit, you aren't counting on color #5, which is blue, for example, to be a specific line width when you plot. You can immediately see the thickness that all your "lines" will be before you plot (see Figure 1.18). What a novel idea.

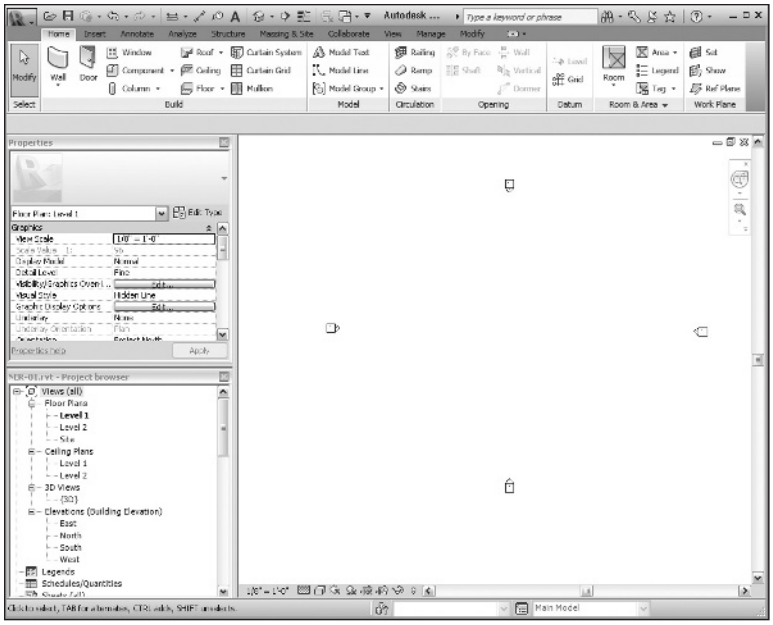


FIGURE 1.18 The view window collects the results of your actions.

To continue placing some walls in the model, keep going with the exercise. (If you have not been following along, you can start by clicking the Wall button on the Home tab. In the Properties dialog box, select Exterior - Brick and CMU on MTL.Stud. Make sure that the wall is justified to the finish face exterior.) You may now proceed:

1. With the Wall command still running and the correct wall type selected, position your cursor in a similar location to the illustration in Figure 1.19. Now, pick a point in the view window.
2. With the first point picked, move your cursor to the left. Notice that a two things happen: the wall seems to snap in a horizontal plane, and a blue dashed line apparently locks the horizontal position. In Revit, there is no "Ortho." Revit will align the typical compass increments to 0, 90, 180, 270, and 45 degrees.
3. Also notice the blue dimension extending from the first point to the last point. Although dimensions cannot be typed over, this type of dimension is a temporary dimension for you to use as you place items. Type **100**, and press the Enter key. (Notice you did not need to type the foot mark (′). Revit thinks in terms of feet. The wall is now 100′ long (see Figure 1.19).

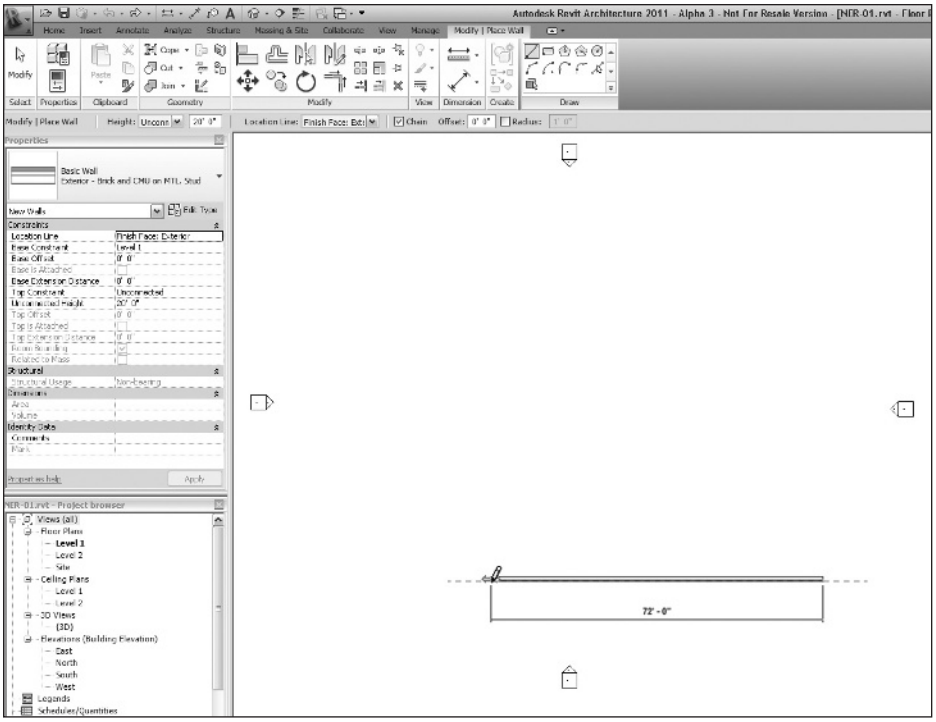


FIGURE 1.19 The procedure for drawing a wall in Revit Architecture

4. With the Wall command still running, move your cursor straight up from the endpoint of your 100′-long wall. Look at Figure 1.20.
5. Type 80 and hit Enter. You now have two walls.
6. Move your cursor to the right until you "run into" another blue alignment line. Notice that your temporary dimension says 100′–0″. Revit understands symmetry. After you see this alignment line, and the temporary dimension says 100′–0″, pick this point.
7. Move your cursor straight down and type **16**, and hit Enter.
8. Move your cursor to the right and type **16**, and hit Enter.
9. Press the Esc key.

Do your walls look like Figure 1.21? If not, try it again. You need to be comfortable with this procedure (as much as possible).

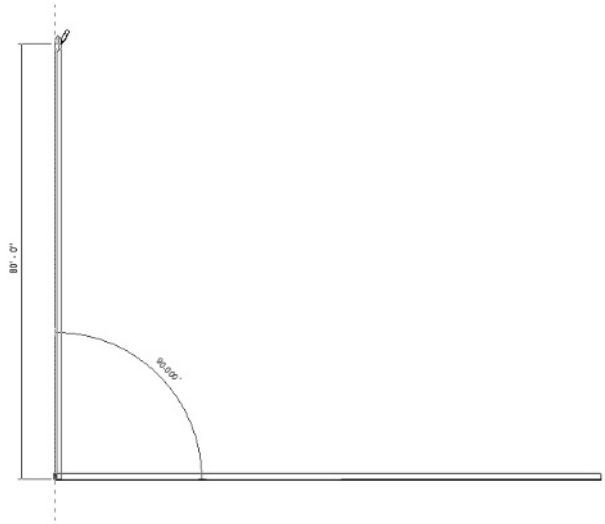


FIGURE 1.20 How Revit Architecture works is evident in this procedure.

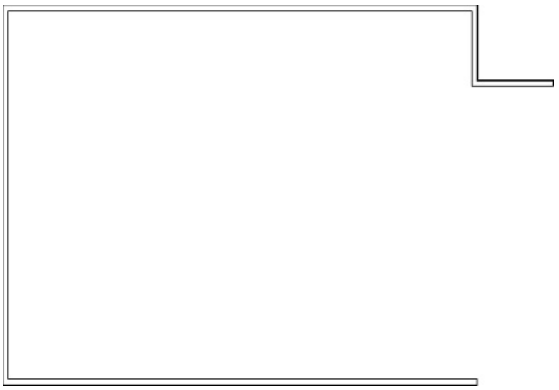


FIGURE 1.21 Working with Revit starts with the ability to work with the view window, and learning the quirks and feel of the interface.

To get used to the Revit flow, always remember these three steps:

1. Start a command.
2. Focus on your options.
3. Move to the view window, and add the elements to the model.

If you start a command, then focus immediately on the view, you will be sitting there wondering what to do next. Do not forget to check your Options bar and the appropriate ribbon tab.

Let's keep going and close this building by using a few familiar commands. If you have never drafted on a computer before, don't worry. These commands are simple. The easiest but most important topic is simply how to select an object.

Object Selection

Revit has a few similarities to AutoCAD and MicroStation. One of those similarities is the ability to perform simple object selection and to execute common modify commands. For this example, we will mirror the two 16′–0″ L-shaped walls to the bottom of the building:

1. Type **ZA** (zoom all).
2. Near the two 16′–0″ L-shaped walls, pick (left-click) and hold down the left mouse button when the cursor is at a point to the left of the walls but above the long, 100′–0″ horizontal wall.
3. You will see a window start to form. Run that selection window past the two walls. After you highlight the walls, as illustrated in Figure 1.22, let go of the mouse button, and you have selected the walls.

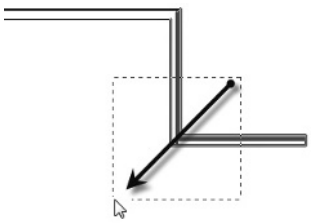


FIGURE 1.22 Using a crossing window to select two walls

There are two ways to select an object: by using a crossing window or by using a box. Each approach plays an important role in how you select items in a model.

Crossing Windows

A crossing window describes an object selection method in which the window being placed only needs to cross through the objects in order to select them. A crossing window will always start from the right and end to the left. The crossing window, when being placed, is represented by a dashed-line composition (see Figure 1.22).

Boxes

A box is an object selection method that will only select the items that are 100 percent inside the window being placed. This method is useful when you want to select only specific items while passing through larger objects that you may not want in the selection set. A box always starts from the left and works to the right. The line type for a selection window is a continuous line (see Figure 1.23).

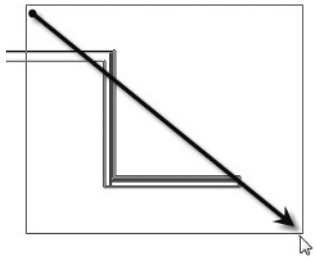


FIGURE 1.23 To select only objects that are surrounded by the window, select a box. This will leave out any item that may only be partially within the box.

Now that you have experience selecting items, you can execute some basic modify commands. Let's begin with mirroring, one of the most popular modify commands.

Modifying and Mirroring

You will find that Revit Architecture requires that you select items first and then execute a command. This is true for most action items, and is certainly true for every command on the Modify toolbar.

1. Make sure only the two 16′–0″ walls are selected.
2. Once the walls are selected, you will see the Modify Walls tab appear. On the Modify panel, click the Mirror Draw Axis button, as shown in Figure 1.24.

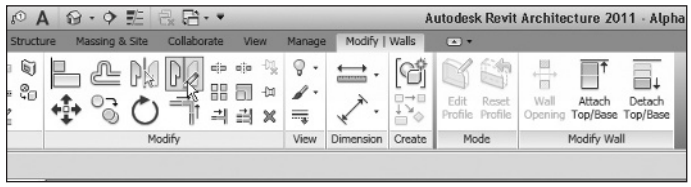


FIGURE 1.24 The Ribbon adds the appropriate commands.

3. Your cursor will change to a crosshair with the mirror icon illustrating that you are ready to draw a mirror plane, as shown in Figure 1.25.

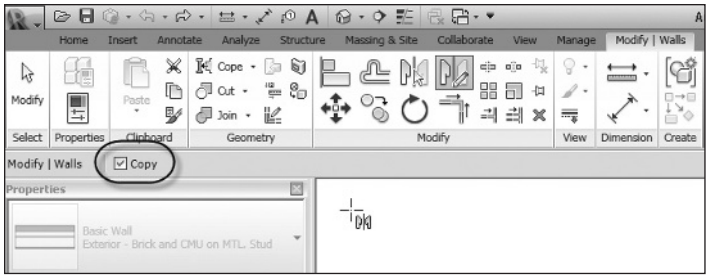


FIGURE 1.25 There are options you must choose for every command in Revit.

4. Make sure the Copy checkbox is selected (see Figure 1.25).

5. Hover your cursor over the inside face of the 80′–0″-long vertical wall until you get reach the midpoint. Revit will display a triangular icon, indicating that you have found the midpoint of the wall (see Figure 1.26).

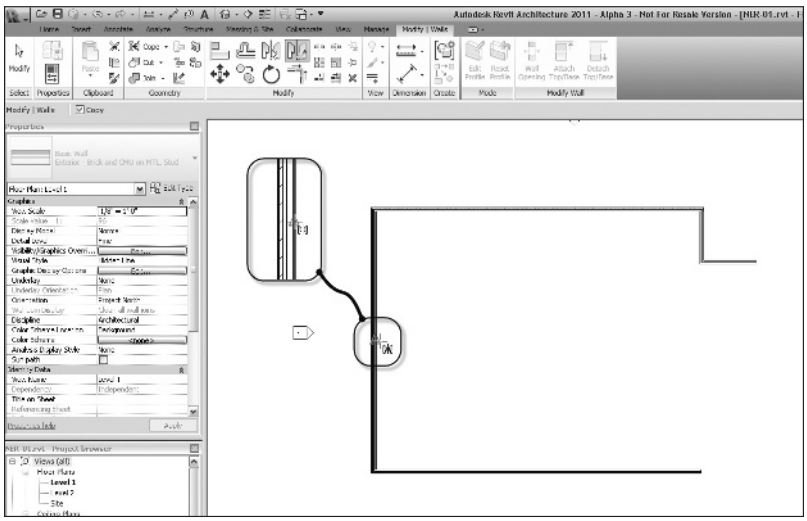


FIGURE 1.26 Revit has snaps similar to most CAD applications. In Revit, you will only get snaps if you choose the draw icon from the Options bar during a command.

6. When the triangular midpoint snap appears, pick this point. After you pick the point where the triangle appears, you can move your cursor directly to the right of the wall. You will see an alignment line appear,

as illustrated in Figure 1.27. When the alignment line appears, you can pick another point along the path. When you pick the second point, the walls are mirrored and joined with the south wall (see Figure 1.27).

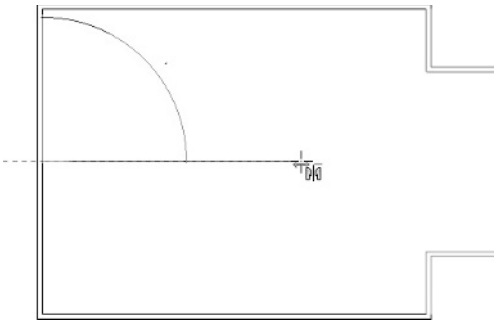


FIGURE 1.27 Mirroring these walls will involve first, picking the midpoint of the vertical wall, then second, picking a horizontal point along the plane.

Now that you have some experience mirroring items, it is time to start adding components to your model by utilizing the items that you placed earlier. If you having trouble following the process, retry these first few procedures. Rome was not built in a day. (Well, perhaps if they had Revit, it would have sped things up!) You want your first few walls to look like Figure 1.28.

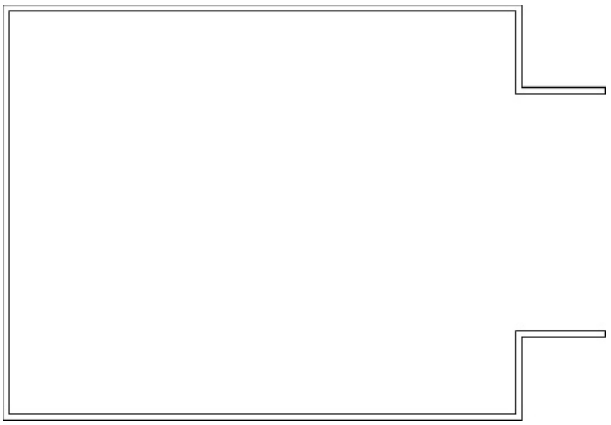


FIGURE 1.28 Your building should look like this illustration.

Building on Existing Geometry

Now that you have some geometry to work with and you have some objects placed in your model, Revit starts to come alive. The benefits of using building information

modeling (BIM) will become apparent quickly, as explained later in this chapter. For example, because Revit knows that walls are walls, you can add identical geometry to the model by simply selecting an item and telling Revit to create a similar item.

Suppose you want a radial wall of the same exact type as the other walls in the model. Perform the following steps:

1. Type ZA to zoom the entire screen.
2. Press the Esc key.
3. Select one of the walls in the model — it does not matter which one.
4. Right-click on the wall.
5. Select Create Similar, as shown in Figure 1.29.

NOTE New to Revit 2011, when you right-click on an item, you can choose to repeat the last command. You can now also select all items that are only in the current view.

6. On the Modify | Place Wall tab, click the Start-End-Radius Arc button, as shown in Figure 1.30.

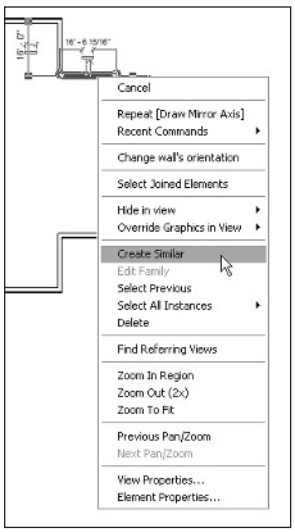


FIGURE 1.29 You can select any item in Revit and create a similar object by right-clicking and selecting Create Similar.

7. Again with the Options? Yes. Make sure your Location Line is set to Finish Face: Exterior.

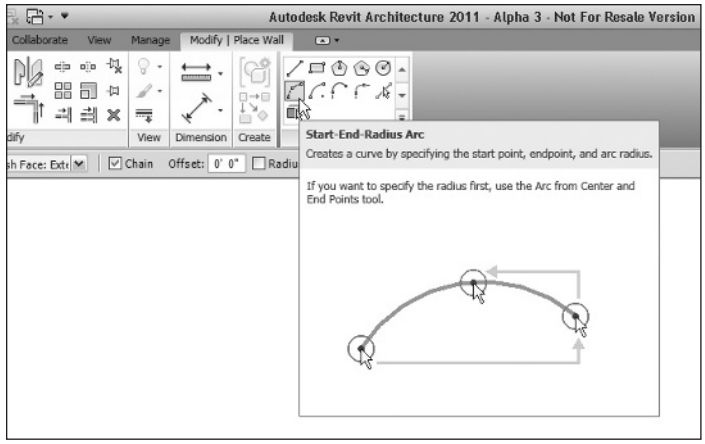

Autodesk Revit Architecture 2011 - Alpha 3 - Not For Resale Version
Collaborate
View
Manage
Modify | Place Wall
View
Dimension
Create
Chain
Offset:
0' 0"
Start-End-Radius Arc
Creates a curve by specifying the start point, endpoint, and arc radius.
If you want to specify the radius first, use the Arc from Center and End Points tool.

FIGURE 1.30 Just because you started the command from the view window does not mean you do not have to look at your options.

8. With the wheel button on your mouse, zoom into the upper corner of the building and select the top endpoint of the wall, as shown in Figure 1.31. The point you are picking is the corner of the heavy lines. The topmost, thinner line represents a concrete belt course below. If you are having trouble picking the correct point, don't be afraid to zoom into the area by scrolling the mouse wheel.

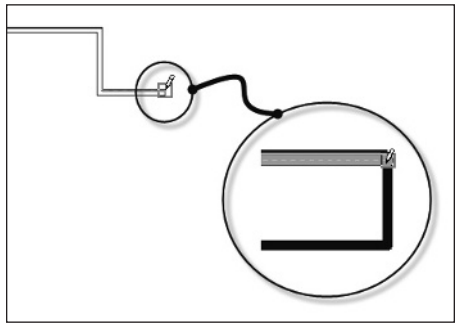


FIGURE 1.31 Select the top corner of the wall to start your new radial wall.

9. Select the opposite, outside corner of the bottom wall. Again, to be more accurate, you will probably have to zoom into each point as you are making your picks.

10. Move your cursor to the right until you see the curved wall pause. You will also see an alignment line and a tangent snap icon appear as

well. Revit understands that perhaps you want an arc tangent upon the two lines you have already placed in your model.

11. When you see the tangent snap icon, choose the third point. Your walls should look like Figure 1.32.
12. Press Esc to terminate the command.

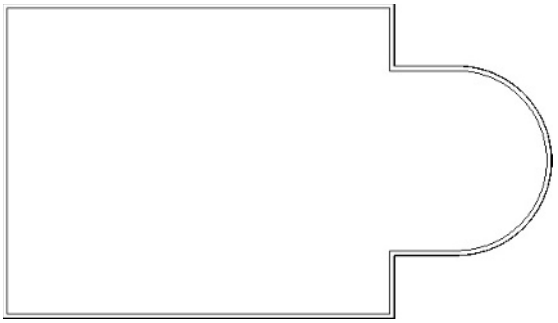


FIGURE 1.32 The completed exterior walls should look like this illustration.

Just because you have placed a wall in the model does not mean the wall looks the way you would like. In Revit Architecture, you can do a lot with view control and how objects are displayed.

View Control and Object Display

Although the earlier procedures are a nice way to add walls to a drawing, they do not reflect the detail you will need to produce construction documents. Well, the great thing about Revit is that you have already done everything you need to do. You can now tell Revit to display the graphics the way you want to see them.

The View Control Bar

At the bottom of the view window, you will see a skinny toolbar (as illustrated in Figure 1.33). This is the View Control bar. It contains the functions outlined in the following list:

FIGURE 1.33 The View Control bar controls the graphical view of your model.

Scale The first item on the View Control bar is the scale function. It gets small mention here, but it is a huge deal. In Revit, you change the scale of a view by

selecting this menu. Change the scale here, and Revit will scale annotations and symbols accordingly (see Figure 1.34).

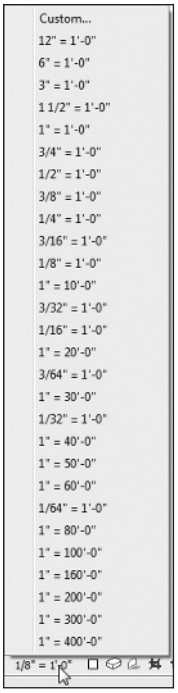


FIGURE 1.34 The scale menu allows you to change the scale of your view.

Detail Level The detail level allows you to view your model at different qualities. You have three levels to choose from: Coarse, Medium, and Fine (see Figure 1.35).

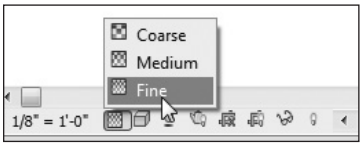


FIGURE 1.35 The detail level control allows you to set different view levels for the current view.

If you want more graphical information with this view, select Fine. To see how the view is adjusted using this control, follow these steps:

1. Click the detail level icon and choose Fine.
2. Zoom in on a wall corner. Notice the wall components are now showing in the view.

TIP When you change the view control in a view, it is not a temporary display. You are telling Revit how you want to plot this view. The view you see on the screen is the view you will see when it comes out of the plotter.

There are other items on the View Control bar, but we'll discuss them when they become applicable to the exercises.

The View Tab

Since Revit is one big happy model, you will quickly find that simply viewing the model is quite important. Within Revit, you can take advantage of some functionality in the Navigation bar. To activate the Navigation bar, first go to the View tab, then click the User Interface button. Make sure the Navigation bar is activated, as shown in Figure 1.36.

One item we need to look at on the Navigation bar is the steering wheel.

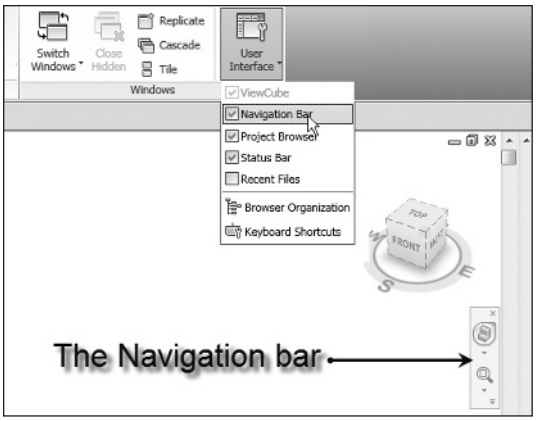


FIGURE 1.36 The View tab allows you to turn on and off the Navigation bar.

The Steering Wheel

The steering wheel allows you to zoom, rewind, and pan. When you click the steering wheel icon, a larger control panel will appear in the view window. To choose one of the options, you simply pick (left-click) one of the options, and hold the mouse button as you execute the maneuver.

To use the steering wheel, follow along:

1. Pick the steering wheel icon from the Navigation bar, as shown in Figure 1.37.
2. Once the steering wheel is in the view window (as illustrated in Figure 1.37), left-click and hold Zoom. You can now zoom in and out.

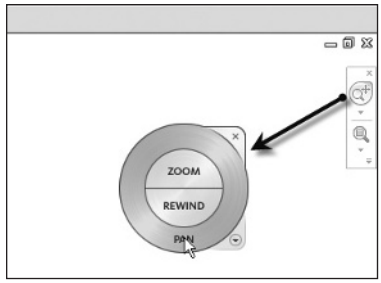


FIGURE 1.37 You can use the steering wheel to navigate through a view.

3. Now click and hold Rewind in the steering wheel. You can now find an older view, as shown in Figure 1.38.

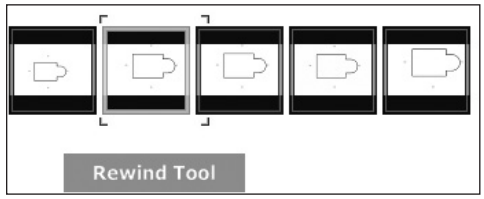


FIGURE 1.38 Because Revit does not include zoom commands in the Undo function, you can rewind to find previous views.

4. Do the same for Pan, which is also found on the outer ring of the steering wheel. After you press and hold Pan, you can navigate to other parts of the model.

Although you can do all of this with your wheel button, some users still prefer the icon method of panning and zooming. For those of you who prefer the icons, you will also want to use the icons for the traditional zooms as well.

Traditional Zooms

The next items on the Navigation bar are the good old zoom controls. The abilities to zoom in, zoom out, and pan are all included in this function, as shown in Figure 1.39.

Of course, if you have a mouse with a wheel, you can zoom and pan by either holding down the wheel to pan or by wheeling the button to scroll in and out.

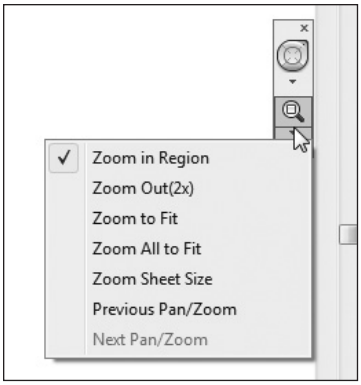


FIGURE 1.39 The standard zoom commands

Thin Lines

Back on the View tab, you will see an icon called Thin Lines, as shown in Figure 1.40. Let's talk about what this icon does.

In Revit Architecture, there is no such thing as layers. Line weights are controlled by the actual objects they represent. In the view window, you see these line weights. As mentioned before, what you see is what you get. Sometimes, however, these line weights may be too thick for smaller-scale views. By clicking the Thin Lines icon, as shown in Figure 1.40, you can force the view to display only the thinnest lines possible to still see the objects.

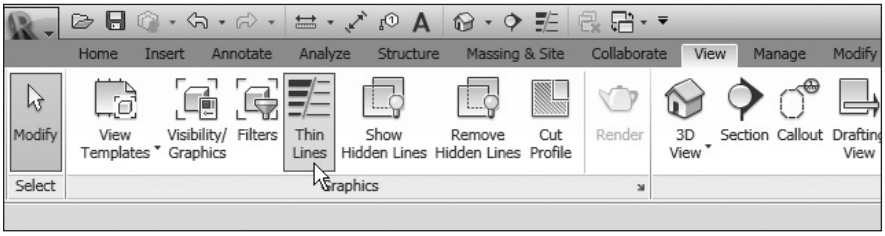


FIGURE 1.40 Clicking the Thin Lines icon will allow you to "operate" on the finer items in a model.

To practice using the Thin Lines function, follow along:

1. Pick the Thin Lines icon.
2. Zoom in on the upper-right corner of the building.

3. Pick the Thin Lines icon again. This toggles the mode back and forth.
4. Notice the lines are very heavy.

The line weight should concern you. As mentioned earlier, there is no such thing as layers in Revit Architecture. This topic is addressed in Chapter 13.

3D View

The 3D View icon brings us to a new conversation. Complete the following steps that will move us into the discussion on how a Revit model comes together!

1. Click the 3D View icon, as illustrated in Figure 1.41.

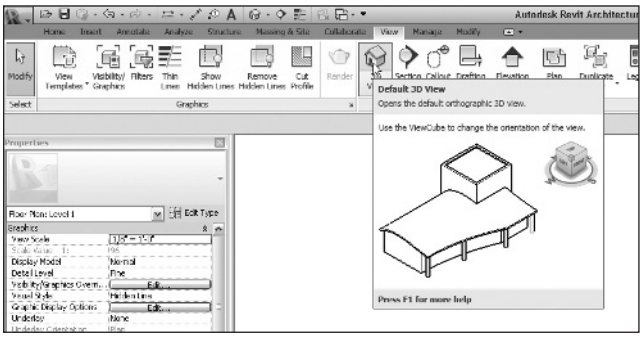

Default 3D View
Opens the default orthographic 3D view.
Use the ViewCube to change the orientation of the view.
Press F1 for more help

FIGURE 1.41 The 3D View icon will be heavily used.

2. On the View Control bar, click the Visual Style button and choose Shaded with Edges, as illustrated in Figure 1.42.

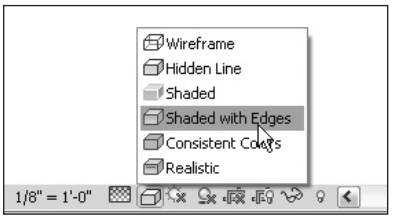


FIGURE 1.42 The Visual Style button enables you to view your model in color. This is typical for a 3D view.

A word of caution: if you do turn your shadows on, do so with care. This could be the single worst item in Revit in terms of performance degradation. Your model *will* slow down with shadows on.

3. Again on the View Control bar, select Shadows Off and turn the shadows on, as illustrated in Figure 1.43, and again in Figure 1.45.

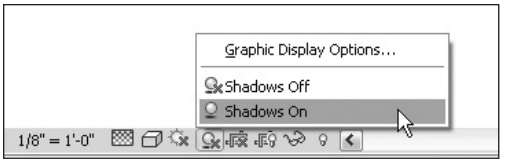


FIGURE 1.43 Shadows create a nice effect, but at the expense of RAM.

Within the 3D view is the ViewCube. It is the cube in the upper-right corner of the view window. You can switch to different perspectives of the model by clicking on the quadrants of the cube (see Figure 1.44).

FIGURE 1.44 The ViewCube lets you freely look at different sides of the building.

TIP The best way to navigate a 3D view is to press and hold the Shift key on the keyboard. As you holding the Shift key, press and hold the wheel on your mouse. Now move the mouse around. You will be able to dynamically view the model (see Figure 1.45).

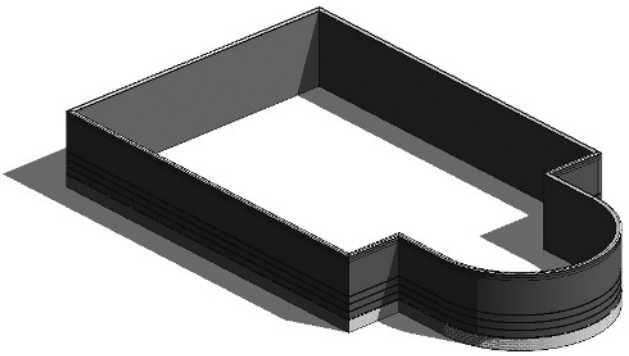


FIGURE 1.45 The 3D model with shading and shadows

Go back to the floor plan. Wait! How? This brings us to quite an important topic in Revit: the Project Browser.

The Project Browser

Revit is the frontrunner of BIM. BIM is sweeping our industry for a reason. One of the biggest reasons is the fact that you have a fully integrated model right in front of you. What this means is that when you need to open a different floor plan, elevation, detail, drawing sheet, or 3D view, you can find it all right here in the model.

Also, this means our workflow is going to change. In most cases, it is going to change drastically. When you think about all the external references and convoluted folder structures that comprise a typical job, you can start to relate it to the way Revit uses the Project Browser. Within Revit, you are using the Project Browser instead of the folder structure previously used in CAD.

This approach changes the playing field. The process of closing the file you are in and opening the files you need to work on is restructured in Revit to enable you to stay in the model. You never have to leave one file to open another. You also never need to rely on external referencing to complete a set of drawings. Revit and the Project Browser will put it all right in front of you.

To start using the Project Browser, follow along:

1. To the far left of the Revit dialog is the Project Browser (see Figure 1.46).

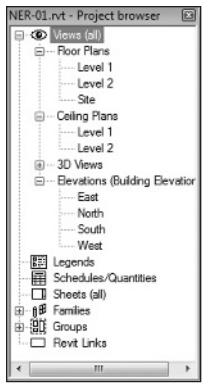


FIGURE 1.46 The Project Browser is your new Windows Explorer.

2. The Project Browser is broken down into categories. One category is Floor Plans. In the Floor Plans category, double-click on Level 1.
3. Next, double-click on Level 2. Notice that your display level is set to Coarse. This is because any change you make on the View Control bar is for that view only. When you went to Level 2 for the first time, the change to the display level had not been made yet.

4. In the view window, you will see little icons that look like houses (see Figure 1.47). These are elevation markers. The elevation marker to the right might be in your building. If this is the case, you need to move it out of the way.

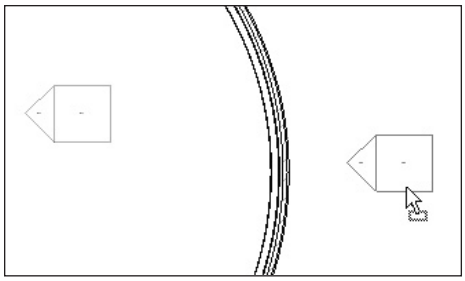


FIGURE 1.47 Symbols for elevation markers in the plan. If you need to move them, you must do so by picking a window. There are two actual items in an elevation marker.

5. Pick a box around the elevation marker. When both the small triangle and the small box are selected, move your mouse over the selected objects.
6. Your cursor will turn into a move icon. Pick a point on the screen and move the elevation marker out of the way.
7. In the Project Browser, find the Elevations (Building Elevation) category. Double-click on South.
8. Also in the Project Browser, notice there is a 3D Views category. Expand the 3D Views category, and double-click on the {3D} choice. This will bring you back to the 3D view you were looking at before this exercise.

WARNING **Hey! What happened to my elevation? You are in Revit now. Items such as elevation markers, section markers, and callouts are no longer just "dumb" blocks. They are linked to the actual view they are calling out. If you delete one of these markers, you will delete the view associated with it. If you and your design team have been working on that view, then you lost that view. Also, you must move any item deliberately and with caution. This elevation marker you moved has two parts. The little triangle is actually the elevation. The little box is the part of the marker that records the sheet number the elevation will wind up on. If you do not move both items by placing a window around them, the elevation's origin will remain in its original position. When this happens, your elevation will look like a section, and it will be hard to determine how the section occurred.**

Now that you can navigate through the Project Browser, adding other components to the model will be much easier. We can now begin to add some windows.

Windows

By clicking on all of these views, you are simply opening a view of the building, not another file that is stored somewhere. For some users this can be confusing. (It was for me.)

When you click around and open all these views, they stay open. You can quickly open many views. There is a way to manage these views before they get out of hand.

In the upper-right corner of the Revit dialog, you will see the traditional close and minimize/maximize buttons for the application. Just below them are the traditional buttons for the files that are open, as shown in Figure 1.48. Click the X for the current view.

FIGURE 1.48 You can close a view by clicking the X for the view. This does not close Revit, or an actual file for that matter — it simply closes that view.

In this case, you have multiple views open. This situation (which is quite common) is best managed on the View tab. To utilize the Window menu, perform the following steps:

1. On the Window panel of the View tab, click the Switch Windows button, as shown in Figure 1.49.
2. After the menu is expanded, look at the open views.

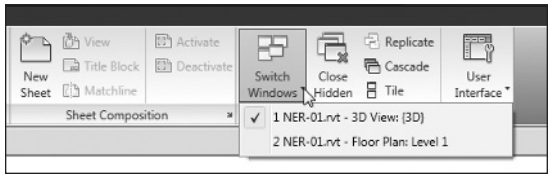
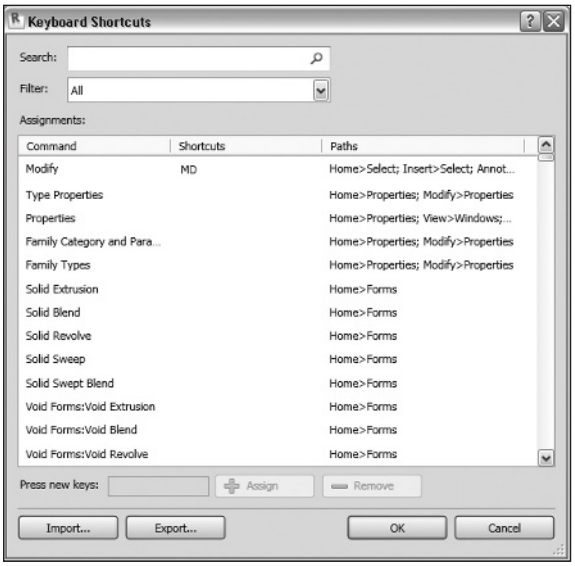


FIGURE 1.49 The Switch Windows menu lists all the current views that are open.

3. Go to the {3D} view by selecting it from the Window menu by clicking the 3D icon at the top of the screen or by going to the {3D} view in the Project Browser.
4. On the Windows panel, click Close Hidden Windows.
5. In the Project Browser, open Level 1.
6. Go to the Windows panel and select Tile Windows.
7. With the windows tiled, you can see the Level 1 floor plan along with the 3D view to the side. Select one of the walls in the Level 1 floor plan. Notice it is now selected in the 3D view to the side. These views you have open are mere representations of the model from that perspective. Each view of the model can have its own independent view settings.

But I Used to Type My Commands!

You can still type your commands. In the Revit menus, you may have noticed that many items have a two- or three-letter abbreviation to the right. This is the keyboard shortcut associated with the command. You can make your own shortcuts or you can modify existing keyboard shortcuts — if you navigate to the View tab. On the Windows panel, click the User Interface button. In the drop-down menu, click the Keyboard Shortcuts button. Here you can add or modify your keyboard shortcuts.



You are at a good point now to save the file. And this brings the book to a good point to discuss the different file types, and their associations with the BIM model.

File Types and Families

Revit Architecture has a unique way in which it saves files and utilizes different file types to build a BIM model. To learn how and why Revit has chosen these methods, follow along with these steps:

1. Click the save icon (see Figure 1.50).

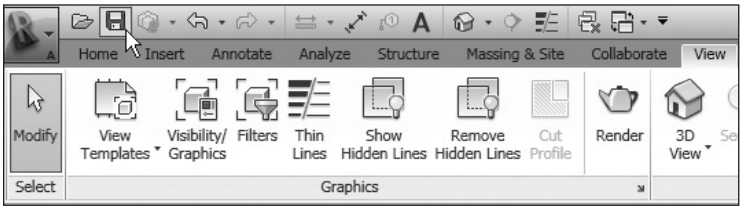


FIGURE 1.50 The traditional save icon will bring up the Save As dialog if the file has never been saved.

2. In the Save As dialog, click the Options button in the lower-right corner (see Figure 1.51).

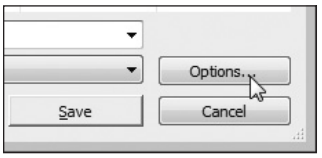


FIGURE 1.51 The Options button in the Save As dialog lets you choose how the file is saved.

3. In the File Save Options dialog, you will see at the top a place where you can specify the number of backups, as shown in Figure 1.52. Set this value to 1.

   Revit provides this option because, when you click the save icon, Revit duplicates the file. It will simply add a suffix of "001" to the end of the filename. Each time you click the save icon, Revit will record this save and add another file called "002," leaving the "001" intact. The default is to do this three times before it starts replacing the 001, 002, and 003 with the three most current files.

4. Under the Preview section, you can specify which view this file will be previewed in. I like to keep it as the active view. That way, I can get an idea if the file is up-to-date based on the state of the view. Click OK.
5. Create a folder somewhere, and save this file into the folder. The name of the file used as an example in the book is called `NER.rvt`. (NER stands for "No Experience Required.") Of course, you can name the file anything you wish, or you can even just do your own project using the steps and examples from the book as a guideline.

FIGURE 1.52 The options in the File Save Options dialog box let you specify the number of backups and the view for the preview.

Now that you have experience adding components to the model, it is time to investigate exactly what we are adding here. Each component is a member of what Revit calls a *family*.

UNDERSTANDING THE REVIT ARCHITECTURE FILE (.rvt)

The extension for a Revit Architecture file is `.rvt`. There are three separate Revit applications: Revit Architecture, Revit Structure, and Revit MEP. All three Revits share the same `.rvt` file extension. You can open a Revit file produced in any of these three applications directly. You do not need object enablers to read items that do not pertain to that discipline.

System and Hosted Families (.rfa)

As mentioned earlier, a Revit model is based on a compilation of items called families. There are two types of families: system families and hosted families. A

system family can be found only within a Revit model and cannot be stored in a separate location. A hosted family is inserted similar to a block (or cell) and is stored in an external directory. The file extension for a hosted family is `.rfa`.

System Families

System families are inherent to the current model and are not inserted in the traditional sense. You can only modify a system family through its Element Properties within the model. The walls you've put in up to this point are system families, for example. You did not have to insert a separate file in order to find the wall type. The system families in a Revit Architecture model are as follows:

Walls

Floors

Roofs

Ceilings

Stairs

Ramps

Shafts

Rooms

Schedules/quantity takeoffs

Annotation items

Views

System families define your model. As you can see, the list pretty much covers most building elements. There are, however, plenty more components not included within this list. These items, which can be loaded into your model, are called hosted families.

Hosted Families

All other families in Revit Architecture are hosted in some way by a system family, a level, or a reference plane. For example, a wall sconce is a hosted family in that, when you insert it, it will be appended to a wall. Hosted families carry a file extension of `.rfa`. To insert a hosted family into a model, follow these steps:

1. Open the `NER-01.rvt` file or your own file.
2. Go to Level 1.
3. On the Home tab, select the Door button.

4. On the Modify | Place Door tab, click the Load Family button, as shown in Figure 1.53. This will open the Load Family dialog.

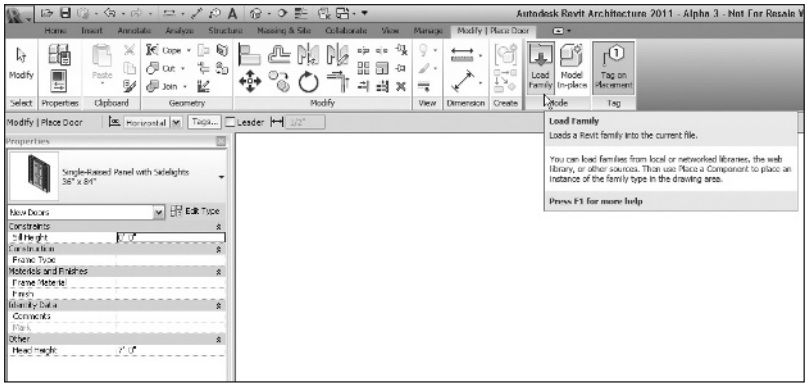

Load Family
Loads a Revit family into the current file.
You can load families from local or networked libraries, the web library, or other sources. Then use Place a Component to place an instance of the family type in the drawing area.
Press F1 for more help

FIGURE 1.53 **You can load an .rfa file during the placement of a hosted family.**

5. Browse to the Doors directory.

   Note that if you are on a network, your directories may not be the same as in this book. Contact your CAD/BIM manager (or whoever loaded Revit on your computer) to find exactly where they may have mapped Revit.

6. Notice there is a list of doors. Select Single-Raised Panel with Sidelights.rfa, and click Open.

7. In the Properties dialog, click the change element type menu, as shown in Figure 1.54. Notice that not only did you bring in the raised panel door family, but you also have seven different types of the same door. These types are simply variations of the same door. You no longer have to explode a "block" and modify it to fit in your wall.

8. Select Single-Flush 36" x 84", as shown in Figure 1.54.

9. Zoom in on the upper-left corner of the building, as illustrated in Figure 1.55.

10. To insert the door into the model, you must place it in the wall. (Notice that before you hover your cursor over the actual wall, Revit will not allow you to add it to the model, as shown in Figure 1.55.) Once your pointer is directly on top of the wall, you will see the outline of the door. Once you see this, pick a point in the wall. The door is inserted. (We will cover this in depth in the next chapter.)

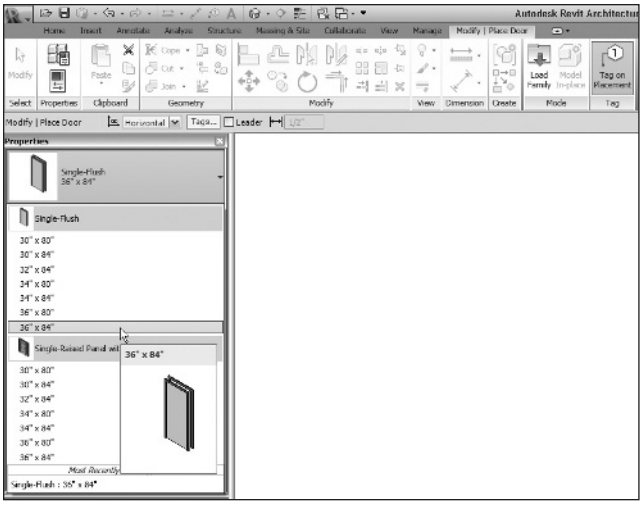


FIGURE 1.54 Each family `.rfa` file will contain multiple types associated with that family.

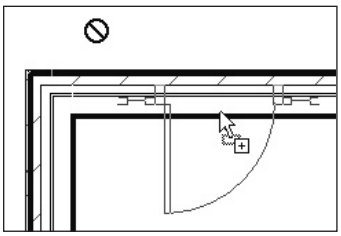


FIGURE 1.55 Inserting a hosted family (`.rfa`)

You will be using this method of inserting a hosted family into a model quite a bit in this book and on a daily basis when you use Revit. Note that when a family is loaded into Revit Architecture, there is no live path back to the file that was loaded. Once it is added to the Revit model, it becomes part of that model. To view a list of the families within the Revit model, go to the Project Browser and look for the Families category. In the Families category, you will see a list of the families and their types, as Figure 1.56 shows.

The two main Revit files have been addressed. Two others are still crucial to the development of a Revit model.

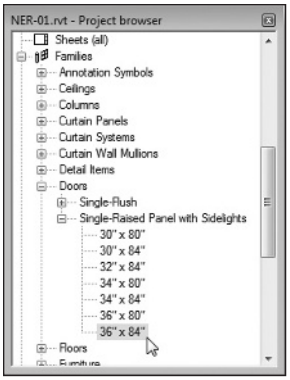


FIGURE 1.56 All of the families are listed in the Project Browser.

Using Revit Template File (`.rte`)

The `.rte` extension pertains to a Revit template file. Your company surely has developed a template for your own standards or will soon. An `.rte` file is simply the default template that has all of your companies standards built into it. When you start a project, you will use this file. To see how an `.rte` file is used, follow these steps:

1. Click the Application menu button and select New ➢ Project.
2. In the resulting dialog, shown in Figure 1.57, click the Browse button.
3. Browsing will throw you into a category with several other templates. You can now choose a different template.
4. Click Cancel twice.

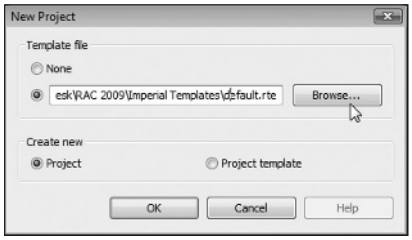


FIGURE 1.57 A new Revit model is based on an `.rte` template file.

Whenever you start a project, you will use the `.rte` template. When you start a new family, however, you will want to use an `.rft` file.

Using Revit Family Files (`.rft`)

The `.rft` extension is another type of template, only this one pertains to a family template. It would be nice if Revit had every family fully developed to suit your needs. Alas, it does not. You will have to develop your own families. You will start with a family template. To see how to access a family template, perform these steps:

1. Click the Application menu button, and select New ➢ Family to open the browse dialog shown in Figure 1.58.

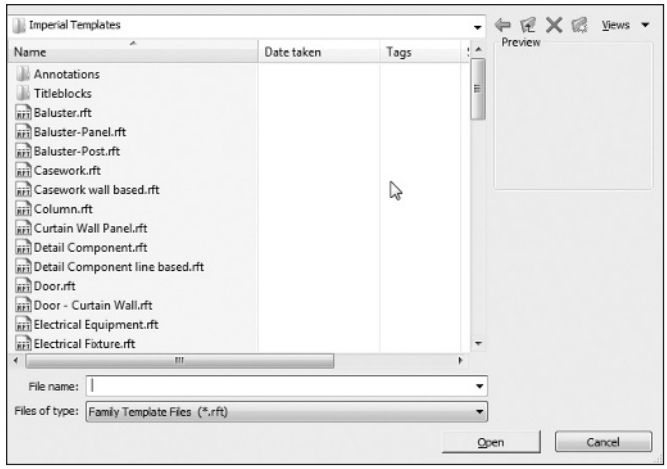


FIGURE 1.58 The creation of a family starts with templates.

2. Browse through these templates. You will most certainly use many of them.
3. Click the Cancel button.

Tempting? I know! We will thoroughly cover creating families in Chapter 17, "Families." As mentioned earlier, you will get to a certain point when you run out of Revit-provided content. If you are feeling brave, go ahead and play around in one of the templates. You have nothing to lose (except time).

Are You Experienced?

Now you can...

- ☑ navigate the Revit Architecture interface and actually start a model
- ☑ find commands on the Design bar and understand how this controls your options
- ☑ find where to change a keyboard shortcut to make it similar to CAD
- ☑ navigate through the Project Browser
- ☑ understand how the Revit interface is broken down into views
- ☑ tell the difference between the two different types of families, and understand how to build a model using them